

# DIGITAL GEOLOGIC MAP OF THE DELIGHT QUADRANGLE, PIKE COUNTY, ARKANSAS

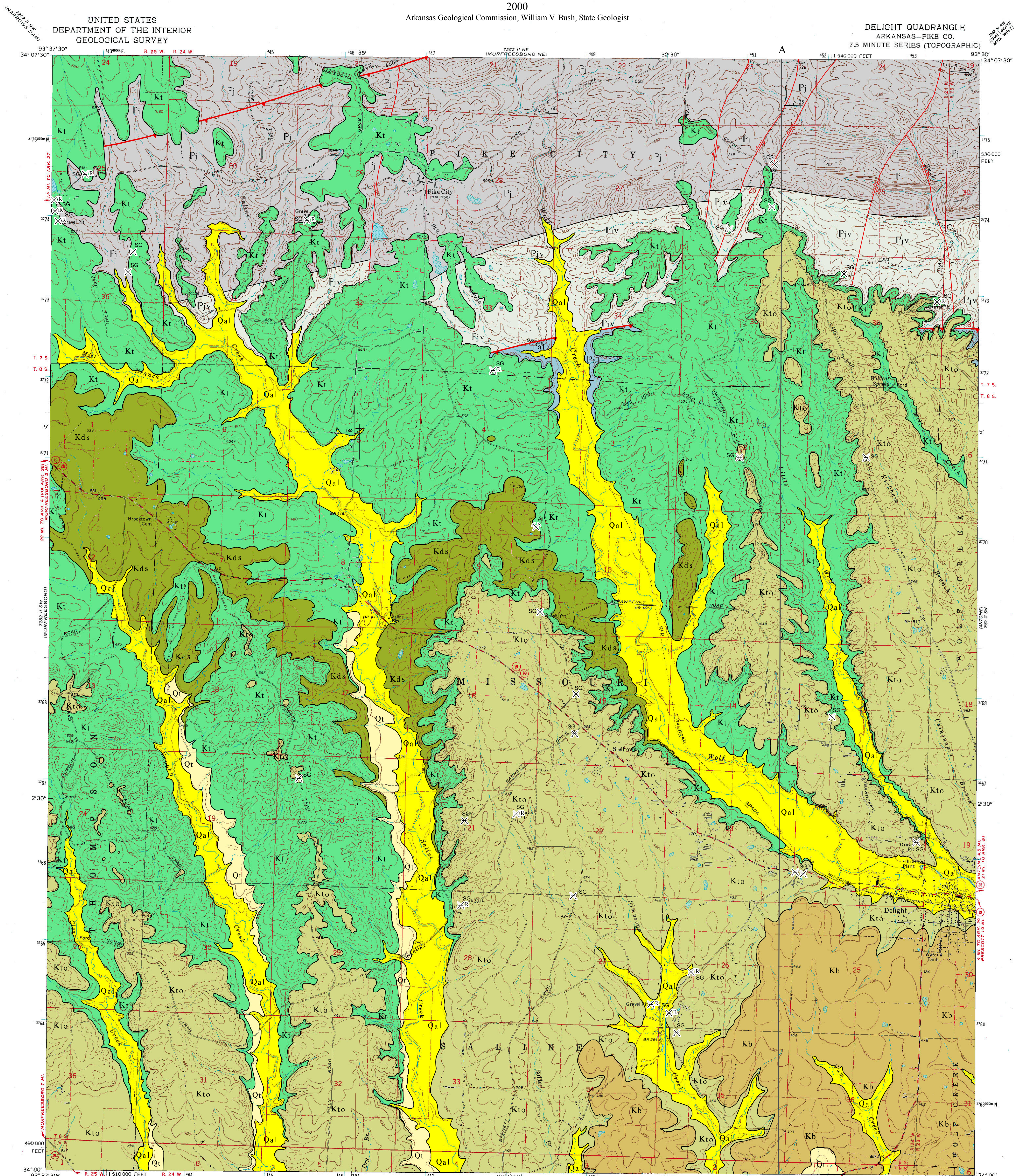
Geology by William D. Hanson, Benjamin F. Clardy, and Jennifer R. Perkins  
Digital compilation by William D. Hanson and Jennifer R. Perkins

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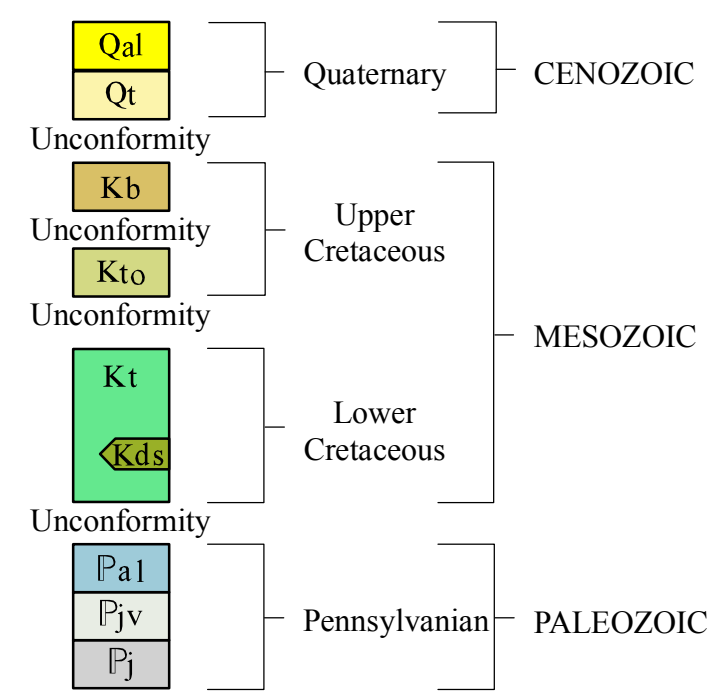
Arkansas Geological Commission, William V. Bush, State Geologist

DELIGHT QUADRANGLE  
ARKANSAS-PIKE CO.

7.5 MINUTE SERIES (TOPOGRAPHIC)



## Correlation of Map Units



## Description of Map Units

- Qal Alluvium (Quaternary)** - Variably sized gravel overlain by unconsolidated sand, silt, and clay comprises this unit. This alluvium occurs in the floodplains of streams and rivers. The sediments form a rich loam suitable for agriculture. Gravels, primarily novaculite, originated in the Ouachita Mountain region and local Cretaceous formations. Thickness varies from 0 to 25 feet. Areas of alluvium are presently receiving sediment deposition.
- Ql Terrace Deposits (Quaternary)** - Terrace deposits generally grade from basal gravel to silt and clay at the top. Gravels, primarily novaculite, originated in the Ouachita Mountain region and local Cretaceous formations. Thicknesses are generally less than 50 feet. Terraces are topographic features, which are former floodplains of nearby streams and/or rivers. The sediments form a rich loamy soil. The basal gravel is sometimes utilized for water-well production and gravel-mining operations.
- Kb Brownstown Marl (Upper Cretaceous)** - The Brownstown Marl consists of dark-gray calcareous clay, marl, and sandy marl. The unit is fossiliferous and weathers yellow to gray in color. The approximate thickness in the quadrangle is 250 feet. Notable fossils are the *Exogyra ponderosa* and *Inoceramus*. The outcrop belt extends from east of Arkadelphia, AR, southwest to the Arkansas-Oklahoma state line, and dips approximately 80 feet per mile to the south. The unit was deposited in a nearshore marine environment and rests unconformably on the Tokio Formation (Upper Cretaceous).
- Kto Tokio Formation (Upper Cretaceous)** - The Tokio consists of cross-bedded sand, gravel, gray clay, and volcanic ash. Basal cross-bedded gravels are approximately 30 feet thick. Sand and clay lenses occur within the gravel, with sand filling the interstitial spaces. Thinner beds (less than 1 foot in thickness) and lenses of gravel occur within the formation's sand intervals. The gravels range from pea-size to 6 inches in diameter and are composed of quartz, novaculite, sandstone, and quartzite. Iron-oxide-cemented conglomerates may be present locally. The cross-bedded sands are medium-to-fine-grained quartz with minor amounts of heavy minerals, glauconite, iron-oxide concretions, and rip-up clasts of gray clay. Volcanic ash is light gray to white and has altered to kaolinitic clay. The source area of the formation's sediment was primarily the Ouachita Mountain region. The outcrop belt extends from near Arkadelphia, southwest to the Arkansas-Oklahoma state line, and dips to the south at approximately 80 feet per mile. The approximate thickness in the quadrangle is 250 feet. The unit was deposited in a nearshore marine environment and unconformably overlies the Trinity Group (Upper Cretaceous).
- Kt Trinity Group (Lower Cretaceous)** - The Trinity is composed of sand, gravel, clay, limestone, asphalt, and evaporate deposits. Members exposed include the Pike Gravel, which occurs at the base of the unit, and the Dierks Limestone Lentil. Sands are primarily medium- to fine-grained and cross-bedded. Marginal marine fossils are noted from the Dierks. The base of the Trinity rests unconformably on a surface of upturned and eroded Paleozoic rocks.
- Kds Dierks Limestone Lentil (Lower Cretaceous)** - The Dierks is an interbedded calcareous clay and fossiliferous limestone found in the lower part of the Trinity Group. The limestones weather to twin slabs and nodular masses. Notable fossils include the *Ostrea franklini*.
- Pa1 Atoka lower (Pennsylvanian)** - The Lower Atoka Formation is primarily composed of numerous thin to thick interbedded layers of grayish black shale, and fine-to-medium grained sandstone. The shale weathers to a light to dark brown color. Minor beds of black siliceous shale, chert, and conglomeratic sandstone are present. Chaotic intervals and debris flows are composed of lenses and masses of sandstone, siltstone shale, and siderite. Some sandstones contain traces of coalified plant remains. The formation has a thickness of approximately 7,000 feet in the mapped area. A complete section of the Atoka strata does not exist in the Athens Plateau. Deep marine turbidite deposition is indicated by the abundant sedimentary features and trace fossils. The Atoka formation conformably overlies the Johns Valley shale (Pennsylvanian).
- Pjv Johns Valley Formation (Pennsylvanian)** - The Johns Valley Shale typically consists of alternating intervals of grayish-black shale and light gray micaceous, silty, fine-to-medium grained sandstone. The shale weathers to a buff gray color and the sandstone weathers to a light to dark brown color. Thin beds of black siliceous shale and chert with siderite concretions are present in some shale. Chaotic intervals occur near the base of the formation and may contain exotic, calcareous fossiliferous siltstones. Carbonized plant remains occur in some of the silty sandstones. The formation has a thickness of about 2,500 feet, but structural deformation prevents an accurate estimate for this area. Deep marine turbidite deposition is indicated by the abundant sedimentary features and trace fossils. The formation is conformable with both the underlying Jackfork Sandstone and the overlying Atoka Formation (Pennsylvanian).
- Pj Jackfork Formation (Pennsylvanian)** - The Jackfork Sandstone contains alternating layers of grayish shale, fine-to-medium-grained light gray, quartzose sandstone. Shales weather reddish- to tannish-gray in color. The sandstone weathers white to reddish-brown in color. Some granule-conglomerate intervals occur in massive quartzose sands in both the upper and lower portions of the formation. Thin intervals of black siliceous shale with some pinkish siderite laminae are sometimes present. Debris flows containing clasts of shale, sandstone, and siderite are locally present sedimentary features and trace fossils. In the Athens Plateau, the Jackfork Sandstone has a total thickness of about 7,000 to 7,500 feet in the quadrangle. About 800 feet of the uppermost Jackfork Sandstone and thick conformable sequences of younger Pennsylvanian strata are absent due to overlap by Lower Cretaceous strata.

## References

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- Dane, C. H., 1929, Upper Cretaceous formation of southwestern Arkansas: Arkansas Geological Survey Bull. 1, 215p.
- Haley, B. R., & Stone, C. G., 1994 Geologic Map of the Antone Quadrangle, Clark and Pike Counties, Arkansas: AGC Open-File Report, scale 1:24,000.
- McFarland, J. D., 1998, Stratigraphic Summary of Arkansas: Arkansas Geological Commission Information Circular 36, 39p.
- Miser, H. D., and Purdue, A. H., 1929 Geology of the DeQueen and Caddo Gap Quadrangles, Arkansas: U.S. Geological Survey, Bulletin 808, 195p.

## Symbols

- Strike / Dip
- Tear Fault
- Thrust Fault
- Formation Contacts
- Abandoned sand and/or gravel pit
- Reclaimed sand and/or gravel pit
- Mine or quarry
- Abandoned mine or quarry
- AP Asphalt
- SG Sand & Gravel
- CS Stone, crushed

## Disclaimer

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